Appendix 5

Essential Fish Habitat Assessment

U.S. Department
of Transportation
**Federal Aviation
Administration**

AAL-614
Alaskan Region Airports Division
222 West 7th Ave #14
Anchorage, AK 99513

April 29, 2013

Brian Lance
National Marine Fisheries Service Alaska Region
Habitat Conservation Division
PO Box 43
222 West 7th Avenue, Rm. 517
Anchorage, AK 99513

Re: Essential Fish Habitat Assessment for Kodiak Airport Runway Safety Area (RSA) Improvement Project

Dear Mr. Lance,

Enclosed is the final Essential Fish Habitat Assessment (EFHA) for the Kodiak Airport Runway Safety Area (RSA) Improvement Project. The project involves construction of improvements to RSAs at Runway ends 25 and 36 at the Kodiak Airport. The Alaska Department of Transportation and Public Facilities (ADOT&PF) proposes to enhance the RSAs on these runways to the extent practicable by placing fill in waters off of the existing runway ends.

This EFHA describes potential effects to salmon and groundfish EFH in the project area. Implementation of the proposed project may include a variety of conservation measures and best management practices. Additionally, compensatory mitigation is being developed to compensate for unavoidable impacts. Based on this EFHA, we have determined that the project is **likely to adversely affect** salmon and groundfish EFH in the project area.

The FAA will release a final environmental impact statement (EIS) in late July or early August that will disclose the environmental consequences of enhancing RSAs at the Airport. The EFHA and your letter of concurrence will be included in the final EIS.

Please feel free to contact me (271-5453, leslie.grey@faa.gov) or Leyla Arsan (279-7922, larsan@swca.com) to discuss the EFHA or request additional information to comply with this request for consultation.

Sincerely,

Leslie Grey
FAA, Alaska Region Airports Division
Kodiak Airport EIS Project Manager

cc: Leyla Arsan, SWCA Environmental Consultants
Brad Rolf, Mead & Hunt (formerly Barnard Dunkelberg & Company)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

December 17, 2012

Leslie A. Grey
Environmental Protection Specialist
FAA-Alaska Region, Airports Division
222 West 7th Avenue, M/S #14
Anchorage, Alaska 99513

Re: DEIS Kodiak Island Airport RSAs
and EFH Assessment

Dear Ms. Grey:

The National Marine Fisheries Service (NMFS) has reviewed the Draft Environmental Impact Statement (DEIS) for the Kodiak Airport Runway Safety Area (RSA) Improvements Project, dated October 15, 2012. The Federal Aviation Administration (FAA) is the lead federal action agency on this project. Currently, the safety areas for runway 07/25 and runway 18/36 at the Kodiak Airport do not meet federal standards. FAA is working with the Alaska Department of Transportation and Public Facilities (ADOT&PF) to improve the RSAs. Under Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), federal agencies are required to consult with the Secretary of Commerce on any action that may adversely affect Essential Fish Habitat (EFH).

EFH has been designated in the project area (nearshore marine waters of Chiniak Bay) for coho, chum, pink, sockeye, and Chinook salmon, as well as walleye pollock, pacific cod, sablefish, flatfish, rockfish, Atka mackerel, skates, squid, sculpins, sharks, octopus, and forage fish. For both RSAs a total of 339,090 cubic yards of clean fill material will be placed in 17.8 acres of intertidal and subtidal marine EFH. The EFH Assessment, (DEIS, Appendix 5) states that the construction of the RSAs for runway 07/25 and runway 18/36 will adversely affect salmon and groundfish EFH. NMFS agrees with the Assessment.

The EFH Assessment describes impacts to EFH for salmon and groundfish from the construction of the RSA for runway 7/25 due to the permanent loss of kelp and algal habitat, as well as shallow, freshwater-influenced habitat near the mouth of the Buskin River. These habitats function as nursery, foraging, and spawning grounds for a variety of fish and invertebrate species. In addition, changes to existing slopes and substrates, will displace juvenile salmon into lower quality habitats.

Additionally, the EFH Assessment states that effects to EFH for salmon and groundfish from the construction of the RSA for runway 18/36 will be less pronounced due to the existing steep, armored shoreline, limited algal cover, and low habitat complexity. The Assessment further states that while there will be loss of EFH, biotic communities will likely remain similar to existing communities and displaced organisms will be expected to find suitable nearby habitat. This assumption fails to take into account the mechanisms that sustain these communities and the consequences that will result from the permanent loss of habitat as a result of the RSA for runway 18/36.

Over the past five years, NMFS has worked closely with the FAA and ADOT&PF to reduce impacts to EFH, resulting in the proposed preferred alternatives. NMFS applauds the efforts of the FAA and ADOT&PF in developing avoidance and minimization measures. Due to this early coordination, NMFS has no further comments on the alternatives listed in the DEIS or EFH assessment. However, these alternatives would still have adverse effects on living marine resources, including EFH, and appropriate compensation should be identified.

In order to compensate for unavoidable impacts to resources ADOT&PF has proposed a fee-in-lieu payment at a 2:1 ratio. This is inadequate to compensate for the permanent loss of nearly 18 acres of productive marine EFH in Chiniak Bay, much of it unique to the area. NMFS notes that other recent projects in Alaska that caused the loss of similar habitats, resulted in higher mitigation ratios (Unalaska Airport, 3:1; Cottonwood Bay, 5:1). NMFS also notes that no analysis has been provided to justify the 2:1 ratio, giving the appearance that this amount was arbitrarily selected.

Clear processes for calculating mitigation are available. The Anchorage Debit-Credit Method, part of the Anchorage Wetlands Management Plan, is one such process where the Environmental Protection Agency, the Corps of Engineers, and the Municipality of Anchorage have developed a methodology to calculate debits and credits for use in fee-in-lieu programs. The Port of Anchorage Expansion project is an example where this methodology was used to calculate compensation for 130 acres of intertidal and sub-tidal fill in Upper Cook Inlet; resulting in an assessed value of $8.8 million, or approximately $67,000 an acre. While NMFS understands this methodology was developed for Anchorage wetlands, the process could be adapted to determine mitigation values for the proposed project.

EFH Conservation Recommendations

NMFS provides the following conservation recommendations pursuant Section 305(b)(4)(A) of the MSA.

1. NMFS recommends the FAA convene a meeting of interested resource agencies to develop mutually agreed upon mitigation to adequately compensate for the unavoidable impacts to the marine environment, including EFH. Further, we recommend that this mitigation package be included in the record of decision for the final Environmental Impact Statement.

Should you have any questions please contact Brian Lance at 907-271-1301 or brian.lance@noaa.gov.

Sincerely,

for J/B

James W. Balsiger, Ph.D.
Administrator, Alaska Region

cc: phil_brna@fws.gov
jack.j.hewitt@usace.army.mil

Jeanne Hanson
11/17/12

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From: Leslie.Grey@faa.gov
Sent: Monday, May 20, 2013 3:50 PM
To: Brian Lance - NOAA Federal
Cc: Leyla Arsan; Amanda Childs; Brad Rolf; Leslie.Grey@faa.gov
Subject: Re: Fw: Kodiak Airport NMFS MSA Consultation

Thanks so much Brian! LG

Leslie A. Grey
Environmental Protection Specialist
FAA - Alaskan Region, Airports Division
907-271-5453

From:	Brian Lance - NOAA Federal <brian.lance@noaa.gov>
To:	Leslie Grey/AAL/FAA@FAA
Date:	05/20/2013 01:27 PM
Subject:	Re: Fw: Kodiak Airport NMFS MSA Consultation

Hi Leslie

This email confirms that the determination and conservation recommendations in the letter from the National Marine Fisheries Service re: DEIS Kodiak Island Airport RSAs and EFH Assessment dated December 17, 2012 remain unchanged and thus apply to the final EFH Assessment dated April 2013.

Please contact me should you have any questions.

Brian

On Mon, May 20, 2013 at 12:50 PM, <Leslie.Grey@faa.gov> wrote:

Hello Brian,

Just a little reminder that when you get a chance, and if you agree, I would really appreciate it if we could get your response to the email below.   Thanks so much! Leslie

Leslie A. Grey
Environmental Protection Specialist
FAA - Alaskan Region, Airports Division
907-271-5453

----- Forwarded by Leslie Grey/AAL/FAA on 05/20/2013 12:43 PM -----

From: Leslie Grey/AAL/FAA
AAL-601, Airports Division
To: Brian Lance
Cc: achilds@swca.com, Brad Rolf <Brad.Rolf@meadhunt.com>, Leyla Arsan <larsan@swca.com>, Leslie Grey/AAL/FAA@FAA
Date: 05/07/2013 09:57 AM
Subject: Re: Kodiak Airport NMFS MSA Consultation

Brian,
Nice talking with you yesterday. With regard to the Final EFHA:

Please reply by to this email to confirm that the findings letter from the National Marine Fisheries Service re: DEIS Kodiak Island Airport RSAs and EFH Assessment dated December 17, 2012 applies to the final EFH Assessment as well as the draft assessment. Your response confirms that the determination and conservation recommendations in the letter apply to the final EFH Assessment dated April 2013.

Thank you very much and as always, please contact me with questions or concerns. Leslie

Leslie A. Grey
Environmental Protection Specialist
FAA - Alaskan Region, Airports Division
907-271-5453

From: Leslie Grey/AAL/FAA
AAL-601, Airports Division
To: brian.lance@noaa.gov
Cc: Leslie Grey/AAL/FAA@FAA, Brad Rolf <Brad.Rolf@meadhunt.com>, Leyla Arsan <larsan@swca.com>, achilds@swca.com
Date: 05/02/2013 08:46 AM
Subject: Kodiak Airport NMFS MSA Consultation

Brian,

The final Essential Fish Habitat Assessment for the Kodiak Airport Runway Safety Area Improvement Project is ready for your review and can be downloaded by following the directions below. A hardcopy of the document is also being sent to you. We have been coordinating with NMFS on this informal consultation and look forward to your concurrence. Please feel free to contact me (271-5453, leslie.grey@faa.gov) or Leyla Arsan (279-7922, larsan@swca.com) to discuss the EFHA or request additional information.

Go to www.swca.com
Scroll to the bottom of the page.
In the gray box at the bottom, under “Login,” select “Client Access.”
Username: Kodiak
Password: EISaccess4BDC [case sensitive]

Thank you! Leslie

Leslie A. Grey
Environmental Protection Specialist
FAA - Alaskan Region, Airports Division
907-271-5453

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907 271-1301
907 271-3030 fax
brian.lance@noaa.gov

ESSENTIAL FISH HABITAT ASSESSMENT FOR THE KODIAK AIRPORT RUNWAY SAFETY AREA IMPROVEMENTS

Prepared for

Federal Aviation Administration
Alaska Department of Transportation and Public Facilities

Prepared by

SWCA Environmental Consultants
1205 East International Airport Road, Suite 103
Anchorage, Alaska 99518

April 2013

CONTENTS

Figures

Tables

Acronyms and Abbreviations

ADF&G	Alaska Department of Fish and Game
ADOT&PF	Alaska Department of Transportation and Public Facilities
Airport	Kodiak Airport
BMP	best management practice
CDFG	California Department of Fish and Game
EFH	essential fish habitat
EFHA	essential fish habitat assessment
EIS	environmental impact statement
EMAS	engineered material arrestor system
FAA	Federal Aviation Administration
FMP	fishery management plan
GOA	Gulf of Alaska
HAPC	habitat areas of particular concern
MHHW	mean higher high water
MSA	Magnuson-Stevens Fishery Conservation and Management Act of 1976
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPFMC	North Pacific Fisheries Management Council
PFMC	Pacific Fishery Management Council
RSA	runway safety area
SWCA	SWCA Environmental Consultants
SWPPP	stormwater pollution prevention plan

ESSENTIAL FISH HABITAT ASSESSMENT

1.0 INTRODUCTION

This document presents the findings of the essential fish habitat assessment (EFHA) conducted for proposed runway safety area (RSA) improvements at the Kodiak Airport (Airport) as required by the Magnuson-Stevens Fishery Conservation and Management Act (MSA) of 1976, as amended. The objective of this EFHA is to describe how the actions proposed as part of RSA improvements may affect essential fish habitat designated by the National Marine Fisheries Service (NMFS).

Essential fish habitat (EFH) is broadly defined by the MSA and the Sustainable Fisheries Act to include "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." This language is interpreted or described in the 1997 Interim Final Rule (NMFS 1997). *Waters* include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include historically used habitat areas, if appropriate. *Substrate* includes sediment, hard bottom, structures underlying the waters, and associated biological communities. *Necessary* has been defined as the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem. *Spawning, breeding, feeding, or growth to maturity* covers a species' full life cycle.

Proposed actions for this project will place fill in marine waters and result in direct loss of marine habitats and indirect adverse effects to those habitats and the species that use them. An environmental impact statement (EIS) is also being prepared that evaluates the various alternatives for the airport runways. This EFHA describes the combination of the two preferred actions: one for Runway 07/25 and one for Runway 18/36.

2.0 PROJECT DESCRIPTION

2.1 Location

The Airport is in Township 28 South, Range 20 West, Sections 14 and 15 (Seward Meridian) in Kodiak, Alaska. It is on the northeast shore of Kodiak Island, approximately 4 miles southwest of the City of Kodiak, in St. Paul Harbor, within Chiniak Bay. The Airport is situated north of Womens Bay and south of the Buskin River mouth (Figure 1).

2.2 Definition of the Project Area

In support of the EIS, SWCA Environmental Consultants (SWCA) conducted fieldwork in the vicinity of the Airport during 2007 and 2008, to document species presence, habitat use, and existing habitat conditions. This *Project Area* consisted of the nearshore marine waters of Chiniak Bay in the immediate vicinity of each of the three proposed RSA extensions, the lower Buskin River beginning downstream of river mile 1.3, and the lower portion of Devils Creek (Figure 2).

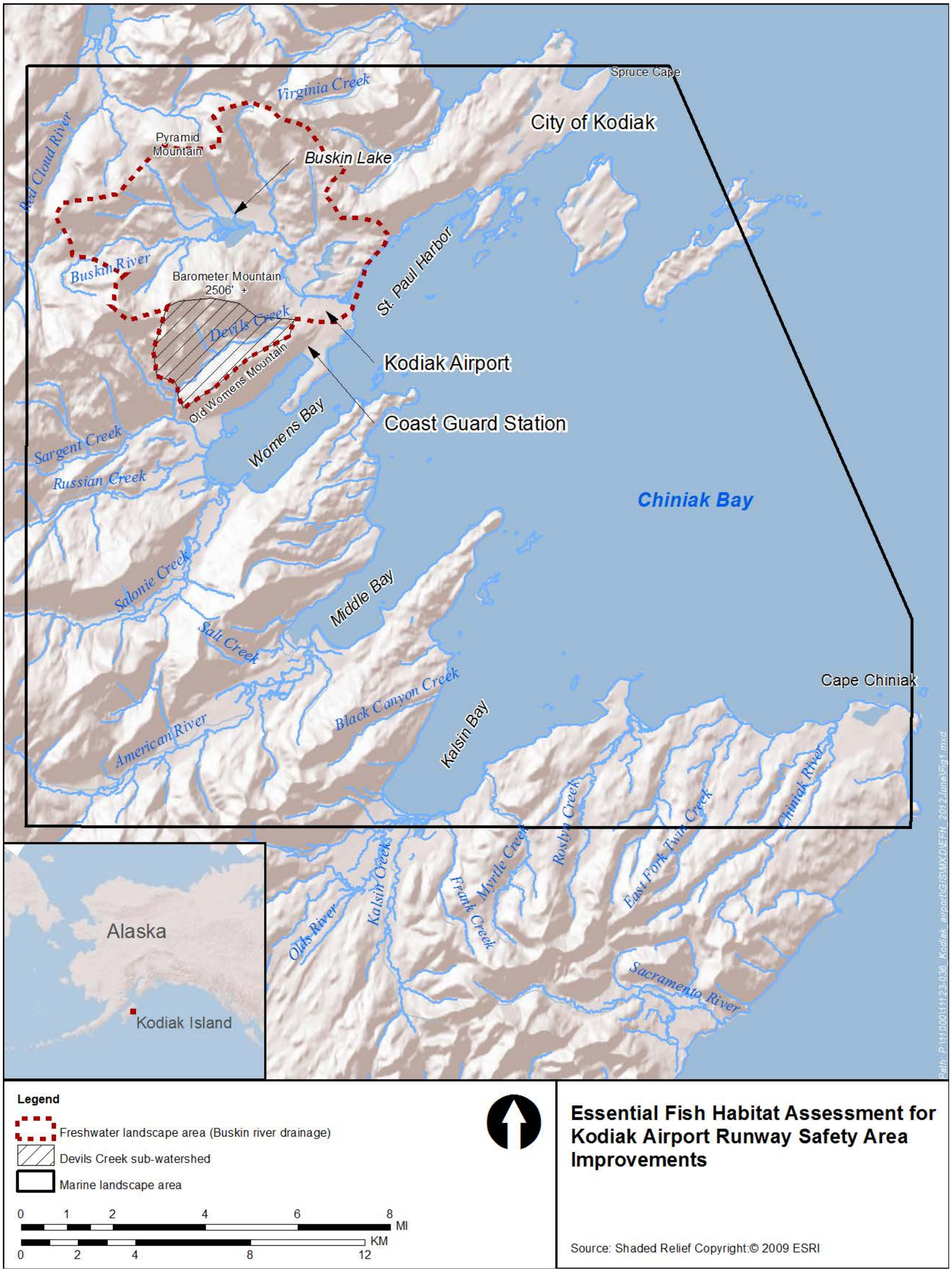

Figure 1. Kodiak Airport vicinity.

Figure 2. Project Area.

2.2.1 Runway End 18

The intertidal area of the Buskin River barrier bar is a low-gradient beach that is mostly sand with gravels. Immediately beyond Runway end 18 is armor rock. Further from the runway end are cobbles and large gravels that are strewn in a band over the sandy surface. Offshore there are some finer sediments. This area is receives some freshwater influence from the Buskin River. The subtidal area continues from the intertidal beach as a flat sandy area, gently sloping toward the bay. Bottom substrates are mostly sand, with some small patches of kelp that attached to larger substrates such as cobble.

2.2.2 Runway End 25

An armor rock embankment extends below Runway end 25. At the base of the embankment is a narrow and sandy intertidal area with a gentle slope similar to the marine side of the Buskin River barrier bar. The sandy intertidal area becomes a flat and rocky subtidal area that is mostly sand mixed with patches of kelp. The rocks in this area are suitable habitat for attached (i.e., sessile) invertebrates and algae.

2.2.3 Runway End 36

Finny Beach is located near the base of Runway end 36. The intertidal area on the north end of the beach is extremely steep and the substrate is composed of large slate boulders. In this area, armor rock extends from the base of the runway into the water. The upper beach in this area is covered with large gravel and chunks of concrete that wash out of the bank above. The substrate transitions from the large armor rock boulders to gravel, then to sand and fine gravel as the beach progresses to the south. Although the main beach is relatively well-protected, there is little evidence of algae beyond the armor rock slope, indicating that substrates at the beach are mobile. At the furthest southern point of the beach, a rocky intertidal point extends out into the bay. The rocks are covered with dense areas of rockweed, and patches of acorn barnacles and Pacific blue mussels. The subtidal area south of Runway end 36 is almost entirely sand. The area east of the base of Runway end 36 is also mostly sand; however, there is one small kelp bed. The substrates within the kelp area are predominantly cobbles and sand.

2.2.4 Buskin River and Devils Creek

The Buskin River and Devils Creek have been highly modified within the Project Area by development of the Airport and the military facilities that preceded it. Development of the facilities now known as U.S. Coast Guard Base Integrated Support Center Kodiak (ISC Kodiak) and the Airport began in 1939 as part of a U.S. military installation. The lower Buskin River extends downstream of the Chiniak Highway bridge and has a gradient of approximately 3.5%. Prior to development, the lower Buskin River was a freely meandering alluvial plain channel, and some reaches still display these characteristics. Portions of the lower river are braided with dense vegetation on the banks, and other portions are confined by bedrock, with alternating pools and riffles. The estuary has a wide meandering channel with a gradient of approximately 0.1% (DOWL 2007). There is also a broad tidal marsh north of the river channel and a smaller tidal marsh area south of the channel. The intertidal area next to the river channel is mostly vegetated intertidal marsh and unvegetated flats. The Buskin River estuary has approximately 9.6 acres of intertidal wetland. The lower portion of Devils Creek flows through the Airport and joins the Buskin River from the south. Within the Project Area, the creek's channel has a fairly straight trajectory and is confined between high banks. Substrates are dominated by cobble and gravel.

2.3 Data Collection Methods

Data on EFH, habitat conditions, and species' use of the Project Area were obtained from literature reviews of existing information, interviews with local experts in biological resources, and field surveys. Various sampling methods were employed during 2007 and 2008 surveys (Table 1); a detailed description of survey methods is available in the *Freshwater and Marine Ecology Technical Report* (SWCA 2009) prepared for the EIS.

Table 1. Sampling Methods Detail for 2007 and 2008

Sample Method	Target Habitat	Target Species	Date of Sampling
Opai net	Freshwater: small off-channel areas	Small fish, juvenile salmonids	June 2008
Fyke net	Freshwater: main channel areas	Small fish, juvenile salmonids	September 2007, June 2008
Beach seine	Freshwater and marine areas: all habitats	Fish	September 2007, June 2008
Minnow trap	Freshwater and estuarine areas	Small fish, juvenile salmonids	September 2007
Snorkel survey	Freshwater and estuarine: areas with at least 2 feet of water	Fish	September 2007, June 2008
Dive (SCUBA) and walking surveys	Marine: intertidal and subtidal habitats	Fish and invertebrates, algae, substrate	March–May 2008
Kick net	Freshwater: areas with 3 feet of water or less.	Invertebrates	September 2007, June 2008
Drift net	Freshwater: main channel areas	Invertebrates	June 2008
Water quality	Estuarine: freshwater/marine interface	n/a, determine salinity intrusion	June 2008
Kelp surveys–visual estimate	Subtidal	Macroalgae and substrate	November 2008

Field surveys were conducted in September 2007 and June 2008 to determine

- the types of aquatic macroinvertebrates in the Buskin River estuary and Devils Creek;
- fish presence, distribution, and timing of habitat use in Devils Creek, the Buskin River, the Buskin River estuary, and the marine side of Buskin River barrier bar; and
- the extent of saltwater inflow in the Buskin River estuary at high tide.

Field surveys were conducted in March, April, and May 2008 to determine

- habitat conditions on the marine side of Buskin River barrier bar (including intertidal and subtidal algae, fish, and invertebrate presence) and substrate composition.

Field surveys were conducted in November 2008 to

- map subtidal kelp beds near Runway end 25; and

- determine substrate composition near Runway end 25.

2.4 Proposed Action

The runway system at the Airport consists of three runways: 07/25, 11/29, and 18/36. Runway 11/29 meets current Federal Aviation Administration (FAA) design standards, but Runways 07/25 and 18/36 do not have the length of RSA necessary at the runway ends to provide adequate overrun or undershoot protection. The Alaska Department of Transportation and Public Facilities (ADOT&PF) proposes to bring the Airport runways into compliance with FAA RSA design standards to the extent practicable.

In general, RSAs are rectangular areas that are centered on the runway, measure 500 feet wide along the length of the runway, and extend 1,000 feet beyond each runway end. In areas where standard size RSAs cannot feasibly be developed off the runway ends, Engineered Materials Arresting Systems (EMAS) can be installed, EMAS consists of pre-cast, crushable, cellular cement blocks that slow or arrest the movement of aircraft that move beyond the end of a runway. The type of aircraft operating at a given airport determines airport-specific RSA design standard dimensions and the runway length needed for those aircraft. The RSA design standards for the Kodiak Runways 18/36 and 07/25 are based on the Boeing 737-400 aircraft.

The existing RSA for Runway 07/25 on the west runway end is 500 feet wide and extends 1,000 feet in front of the landing threshold. However, there is no safety area in front of the Runway 07/25 landing threshold on the east runway end, a deficiency of 1,000 feet from design standards. The existing RSA for Runway 18/36 is 500 feet wide and contains no additional distance beyond the end of either runway (i.e., the RSA is deficient the full 1,000 feet on both runway ends).

This EFHA describes the combination of the two proposed actions (one for Runway 07/25 and one for Runway 18/36). The proposed actions will meet the project purpose and need (to provide RSA improvement and safety enhancement) while minimizing detrimental environmental impacts. The Runway 07/25 action will extend the runway's RSA 600 feet to the east (Figure 3). The Runway 18/36 action will extend the runway's RSA to the south (off Runway end 36) (Figure 4) by 600 feet. These actions are described below.

Construction of the RSAs will require approximately 719,000 cubic yards of fill, including gravel for the embankments, medium-size underlayer stone, large-size armor stone, crushed aggregate base course, and sub-base course (DOWL HKM 2009). The source of these materials is currently unknown. However, for the purposes of this BA, it is assumed that gravel for the embankments will come from an on-island source and be delivered, by truck, to the site. The use of Kodiak-area fill sources will require hauling operations for 45 to 90 days, 10 hours a day (DOWL HKM 2009). Haul routes will be located along the Kodiak Island road system and on existing Airport access roads. Embankment materials will be placed by conventional end dump methods from the existing embankments.

Underlayer and armor stone will come from an off-island source and be barged to the construction area. Transportation of underlayer and armor stone will require 10 to 20 barge trips over the construction period. Armor rock will be placed into its final location with a crane or loader (DOWL HKM 2009). Should all fill materials (armor rock and gravel) be barged to the site, there will be up to 400 barge trips required for construction of the RSAs. Currently, there are one or two large vessels and 10 to 20 small vessels traveling in and out of Kodiak via the Chiniak Bay ship channel on a daily basis. If all fill materials are barged to the site and small barges are used for project construction, approximately 400 barge trips will be required. This will result in the addition of approximately one barge per day to current boat traffic in Chiniak Bay.

Construction will take place over the course of approximately three years and will be completed in 2015. Construction will be phased so that in-water work will not occur on more than one runway at a time. It is anticipated that improvements to Runway 07/25 will be initiated first, with improvements to Runway 18/36 to be implemented upon completion of work on Runway 07/25. Work will also be scheduled to minimize impacts to operations by large aircraft, such as Alaska Airlines' 737s and the U.S. Coast Guard's C-130s. For these aircraft, off-peak season is typically from November to March, and work during this time will have the fewest impacts on their operations (DOWL HKM 2009). Some construction activities, such as preparation of the finished surfaces (e.g., sub-base, crushed aggregates, and paving) will need to be completed during the summer, in coordination with the ADOT&PF, FAA, and the U.S. Coast Guard.

2.4.1 Runway 07/25 Action

The proposed action for Runway 07/25 will enhance the RSA at the east end of the runway through an extension into St. Paul Harbor, east of the Airport, and the use of EMAS. Fill will be placed off Runway end 25 to create a landmass 600 feet long by 500 feet wide. The Airport's existing runway length of 7,542 feet will be maintained. The Runway end 25 EMAS bed will be approximately 170 feet wide and 385 feet in length, installed on pavement with a minimum setback of 35 feet from the runway threshold. The site design will also include sufficient area around the perimeter of the EMAS bed footprint to allow emergency vehicle access.

The EMAS will provide a 70-knot stopping capability on Runway end 25 for the runway's design aircraft. The existing RSA will be enhanced for aircraft overruns on Runway end 25 (i.e., for takeoffs to the east), the primary operational flow of the Airport for departures, providing an equivalent level of safety for aircraft overruns as that offered by a traditional graded 1,000-foot RSA. The expanded landmass beyond Runway end 25 will also meet FAA standards for undershoots by providing 600 feet of RSA.

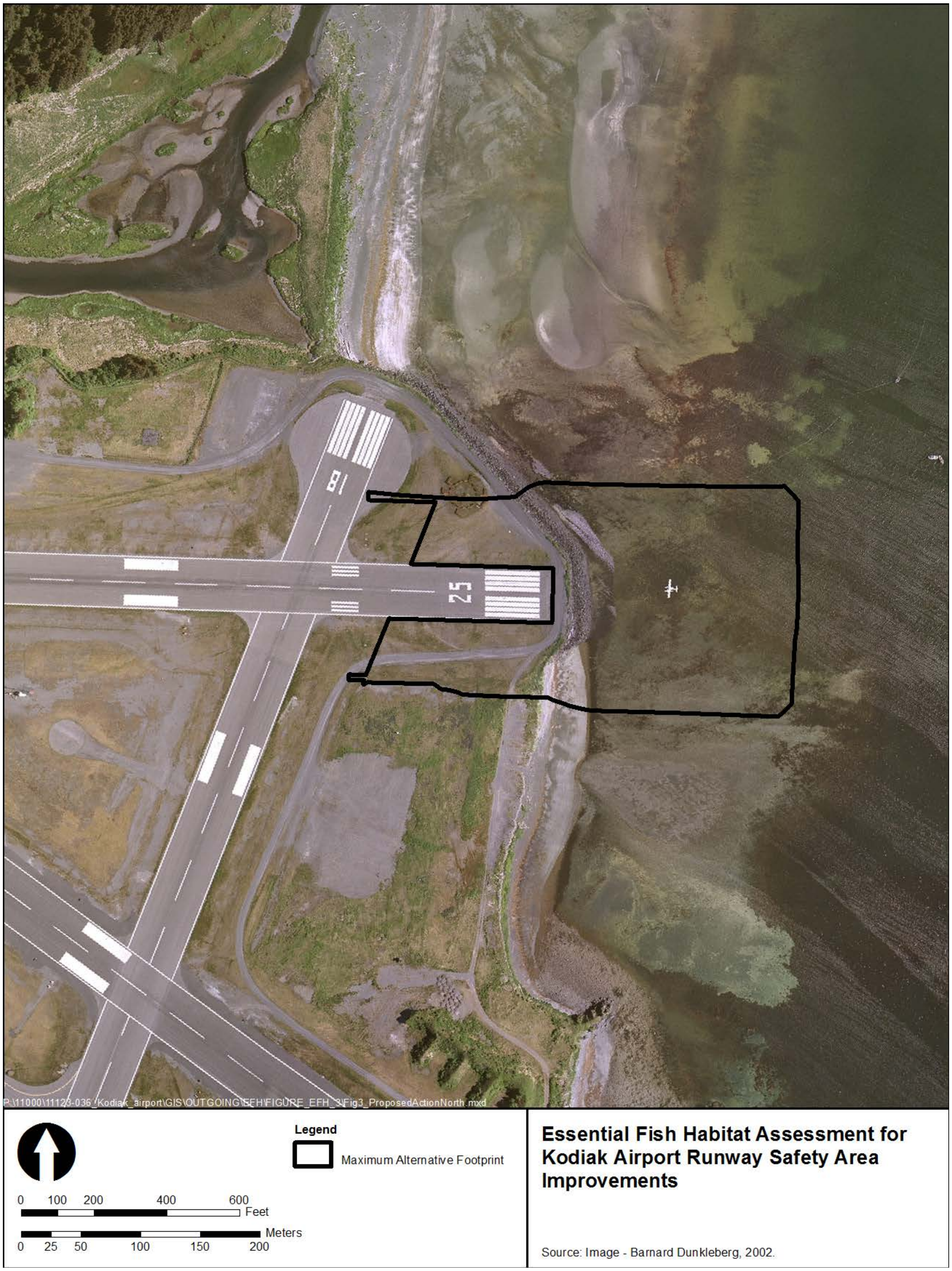

Figure 3. RSA extension footprints for Runway End 25 proposed action.

Figure 4. RSA extension footprint for Runway End 36 proposed action.

Approximately 256,932 cubic yards of fill will be required to construct the new landmass needed to support the EMAS. The potential environmental impacts related to the Runway 07/25 proposed action will be associated with the loss of marine habitat from the placement of this fill to construct a 600-foot landmass expansion on Runway end 25.

2.4.2 Runway 18/36 Action

The proposed action for Runway 18/36 will enhance the RSA at the north and south end of Runway 18/36 through a 600-foot-long by 500-foot-wide landmass extension at the south (beyond existing Runway end 36) and a shift in the runway location 240 feet to the south. An EMAS bed approximately 170 feet wide and 165 feet long will be placed beyond Runway end 18 (north), installed on existing pavement with a minimum setback of 35 feet from the runway threshold. The EMAS bed will provide a 40-knot stopping capability on Runway end 18 for the runway’s design aircraft.

The existing runway length of 5,013 feet will not change, but the runway end thresholds will be shifted 240 feet south of their current locations. This action will provide 360 feet of undershoot protection for landings from the south to Runway end 36 and 240 feet of undershoot protection for landings from the north to Runway end 18. This action will also provide 40-knot stopping capability for overruns beyond Runway end 18 and will provide 360 feet of overrun protection for landings and takeoffs to the south.

Approximately 462,081 cubic yards of fill will be required to construct the new 600-foot landmass extension to the south beyond Runway end 36, shift the runway 240 feet, and install a 40-knot EMAS at the north end of the runway. The potential environmental impacts related to this action will be associated with the short term consequences of fill placement into St. Paul Harbor and the long-term changes resulting from lost habitat and new landmass in the marine environment. This action avoids placing any fill north of the existing runway toward the Buskin River. No in-water work is proposed for Buskin River tributaries (including Devils Creek) or the mainstem of the Buskin River.

3.0 ESSENTIAL FISH HABITAT

EFH is identified by the North Pacific Fishery Management Council only for species managed under a federal fishery management plan (FMP). In the Kodiak area, EFH has been defined for the Alaska stocks of Pacific salmon, managed by the North Pacific Fishery Management Council, and Gulf of Alaska (GOA) groundfish, managed under the GOA groundfish FMP (NPFMC 2008, 2009). The following sections describe EFH in the Project Area and Chiniak Bay.

3.1 Salmon EFH

Marine EFH for coho, chum, pink, sockeye, and Chinook salmon occurs in nearshore marine waters that will be affected by construction of the Runway 07/25 and Runway 18/36 RSAs. The shallow nearshore waters in the Runway end 25 RSA footprint receive freshwater influence from the Buskin River (Coastline Engineering and Dynamic Solutions-International 2009).

Distribution and concentration of the Buskin River freshwater plume are determined primarily by winds; the plume does not appear to extend south to Runway end 36.

Freshwater EFH for salmonids occurs in the Buskin River. The Buskin River and its tributaries are identified as important freshwater spawning areas for chum, coho, pink, and sockeye salmon. Further, Buskin Lake, Lake Louise, and Lake Catherine are listed as important spawning waters for coho and sockeye salmon in the Alaska Department of Fish and Game's *Catalog of Waters Important for Spawning, Rearing, or Migration of Anadromous Fishes* (ADF&G 2012).

EFH species use the Buskin River estuary for rearing and migration. Although Chinook salmon do not spawn in the Buskin River, adult and sub-adult Chinook inhabit Chiniak Bay and are therefore addressed in this EFHA. The life stages of salmon that may have their EFH affected by the proposed actions are listed in Table 2.

Several salmon species were documented in the Project Area during SWCA's 2007 and 2008 field surveys. During these field observations, the following species were most abundant:

- coho salmon
- chum salmon
- sockeye salmon
- pink salmon

Table 2. Pacific Salmon and GOA Groundfish with Designated EFH Present in the Project Area

EFH Species	Eggs	Larvae	Estuarine Juveniles	Late Juvenile	Adult
Salmon (coho, chum, sockeye, pink)	–	x	x	x	x
Salmon (Chinook)	–	–	–	x	x
Walleye pollock	x	x		x	x
Pacific cod	x	x		x	x
Yellowfin sole	x	x		x	x
Arrowtooth flounder		x		x	x
Rock sole		x		x	x
Alaska plaice	x	x		x	x
Rex sole	x	x		x	x
Dover sole	x	x		–	–
Flathead sole	x	x		x	x
Sablefish	–	–		–	–
Pacific ocean perch		x		x	–
Shortraker/rougheye rockfish		x			–
Northern rockfish		x			–
Thornyhead rockfish		x		–	–
Yelloweye rockfish		x		x	x
Dusky rockfish		x			–

EFH Species	Eggs	Larvae	Estuarine Juveniles	Late Juvenile	Adult
Atka mackerel		x			x
Sculpins				x	x
Skates					x
Sharks[1]					
Octopus[1]					
Forage fish complex[1]					
Squid				x	x

x = species is present and EFH has been designated within the Kodiak Airport Project Area.
– = EFH exists within the vicinity, but not within Project Area.
[1] = species known to be present in Chiniak Bay; however, EFH description has not been determined due to insufficient information.
Sources: NMFS 2005; NPFMC 2009.

3.2 Groundfish EFH

Marine EFH occurs in the project area for the following nonsalmonid, marine species in the GOA Groundfish FMP: walleye pollock, Pacific cod, sablefish, flatfish, rockfish, Atka mackerel, skates, squid, sculpins, sharks, octopus, and forage fish. Forage fish are species identified as having ecological importance as prey. Forage fish species identified in Chiniak Bay include smelt (capelin, eulachon, and surf smelt), Pacific sandfish, Pacific sand lance, and invertebrate krill (NPFMC 2008). Table 2 present the species and life stage(s) of fish with designated EFH in the vicinity of the Airport. In some instances, the information needed to describe “those waters and substrate necessary … for spawning, breeding, feeding, or growth to maturity” as defined in NMFS (1997) for an EFH species is insufficient, and descriptions have not been determined. These instances are noted in Table 2.

Various groundfish species were documented in the Project Area during field surveys conducted by SWCA in 2007 and 2008. During these field observations, the following species were most abundant:

- rock sole and other flatfish (starry flounder, butter sole, sand sole)
- sculpins (Pacific staghorn, buffalo, great, tidepool)
- forage fish (Pacific sand lance, krill)

3.3 Other Species with Important EFH Implications

Although Pacific herring are not included in the forage fish category of the GOA Groundfish FMP, this important forage fish species is an integral part of the ecosystem. Herring are not a federally managed species; the management of herring falls under the State of Alaska’s jurisdiction. Due to their importance as a prey species, an analysis of the project’s effects on herring is included as part of this EFH, as an adverse effect on herring will likely translate into an adverse effect on other managed species.

3.4 Habitat Areas of Particular Concern

Within designated EFH, habitat areas of particular concern (HAPCs) can also be identified. HAPCs may be identified for their ecological importance to the long-term sustainability of managed species, for their rarity, or for their susceptibility to degradation or development. Kelp meets EFH/HAPC considerations, has been found within the Project Area, and will be affected by the Runway end 25 RSA improvement. However, no specific HAPCs have been identified within or near designated EFH adjacent to the Airport or in Chiniak Bay.

4.0 ANALYSIS OF EFFECTS TO EFH

Changes to EFH that will result from the RSA improvements are summarized in Table 3. Potential long-term impacts to Pacific salmon and GOA groundfish EFH are discussed in detail in subsequent sections.

The EIS for the project details the environmental impacts on fish species associated with RSA extensions. The placement of fill in marine areas will be required at Runway ends 25 and 36. Potential effects on salmon and groundfish EFH include temporary construction-related impacts, loss of existing habitat, creation of new habitat types, changes in prey production, and localized changes to existing fish and invertebrate communities.

Table 3. Acres of Direct Habitat Loss for Salmon and Groundfish EFH from RSA Improvements

Habitat Type	Dominant Substrate	Runway 07/25: Extend Runway end 25 by 600 feet and use EMAS	Runway 18/36: Extend Runway end 36 by 600 feet and shift Runway end 18 south by 240 feet	Combined Runway Actions
Intertidal	Sand	0.6	0.4	1.0
	Sand and gravel	0	0.2	0.2
	Gravel and cobble	0	0.1	0.1
	Bedrock	0	<0.1	<0.1
	Armor rock	0.2	0.8	1.0
Subtidal	Sand	2.0	4.9	6.9
	Sand and gravel	0	0.4	0.4
	Gravel	0.3	0	0.3
	Gravel and cobble	6.0	2.3	8.3
	Bedrock	0	<0.1	<0.1
	Armor rock	0	<0.1	<0.1
Supratidal (above MHHW mark)	Riparian vegetation	0.2	1.6	1.8
	Rock armor	0.4	0.5	0.9
	Sand and gravel	0.1	0	0.1
	Sand	0	<0.1	<0.1
Total Acres		**9.8**	**11.1**	**20.9**

Note: Accuracy ±0.1 acre.

MHHW = mean higher high water.
Source: SWCA 2009.

4.1 Impacts Common to Salmon and Groundfish EFH

Existing intertidal and subtidal habitats in the project area support various species of kelp and other algae. Kelp stands ranging from 10% to 50% cover east of Runway end 25 will be lost in the RSA expansion (Figure 5). A portion of the proposed fill area also includes cover by other algal species, such as red ribbon and filamentous green algal species.

The new armor rock on embankment side slopes in marine waters will create new rocky intertidal and rocky subtidal zones along the perimeter of the RSA extensions, and will replace existing intertidal armor rock on the current runway end within the project footprint. Armor rock side slopes in subtidal and intertidal areas will be constructed using a 2:1 slope around the perimeter of the footprint for both proposed actions. Although some armor rock currently exists in the supratidal and upper intertidal area at Runway end 25, it does not extend to the subtidal zone (see Figure 5). The surface of the new armor rock fill will likely be colonized by species similar to those supported by the existing armor rock shoreline and also by subtidal species. Colonization will begin in the construction completion year (2014), but populations at the project site will likely take several years to reach existing levels of abundance and maturity (Konar 2007; Lacroix 2001). There will be an additional 1.4 acres of rock armor placed in the supratidal zone from Runway 07/25. Armoring from the supratidal through the subtidal zones will limit nutrient exchanges and recruitment of terrestrial food sources between these zones.

Because substrates in the project footprint will change from sand, gravel, and cobble to armor rock, fish and invertebrate assemblages using those habitats will also be likely to change (Figure 5 and 7). A change in gradient and substrates along the shoreline will likely cause long-term changes in the assemblage of potential fish prey that live on or in the substrate in the immediate vicinity of the proposed action footprints. Shoreline armoring has been shown to decrease local abundance and species richness of invertebrate and insect assemblages in the supratidal zone (the area immediately upland from the tidal zone) in Puget Sound, Washington (Sobocinski 2003). Armoring will also limit the availability of terrestrial prey and nutrient inputs for fish as well as for primary producers in nearshore waters (Dugan et al. 2011). These changes to the existing shoreline will likely result in long-term localized changes to fish assemblages in the vicinity of the fill footprints for Runway end 25, with an increase in species preferring rocky substrates and a decrease in species preferring soft-bottom to cobble substrates. Planktonic prey species abundance is not expected to change. The new armor rock will have less adverse effects at Runway end 36 because the existing shoreline is composed of armor rock, which limits connectivity, transfer of nutrients, and prey items, as well as recruitment of organic material between the intertidal and the supratidal and riparian area (Figure 7). Therefore, armor rock fill placed at Runway end 36 will not change the connectivity from supratidal to subtidal zones since the existing connectivity is limited.

Extension of both runway ends will increase the volume of stormwater entering the marine environment from the construction of new impervious and/or less pervious surfaces. Any stormwater discharge increases will be expected to be minor compared to the total area of Kodiak Airport, and no significant impact will be anticipated as a variety of best management practices (BMPs) will be used to ensure that water quality conditions are maintained (discussed in Section 6 below). Also, no long-term changes to freshwater inputs, effluent mixing zones, or marine water quality are anticipated as a result of either proposed action. Therefore, no measurable effects to aquatic species from changes in water quality are expected.

4.2 Impacts to Pacific Salmon EFH

Eastward extension of the Runway end 25 landmass will alter the flow path of fresh water coming from the Buskin River. Soft-bottom habitat at the beach south of Runway 07/25 will no longer receive freshwater influence (see Figures 5 and 6). This indirect loss of freshwater influence is in addition to the direct loss of freshwater-influenced habitat by placement of RSA fill. Species that follow the freshwater plume will use the area south of Runway end 25 less often. The Project Area currently has 101.7 acres of freshwater-influenced habitat at high tide, and impacts from the Runway 07/25 proposed action will reduce the amount of this habitat type by 18.0% in the Project Area. A slight increase in freshwater-influenced habitat of about 2.4% will occur along the barrier bar, and an increase of about 1.6% will occur at the beach to the north of the Buskin River since more fresh water will be contained in the area north of Runway end 25. However, the area of increase will occur along the off-shore edge of the plume, in deeper waters that are less preferable to juvenile salmonids. Meanwhile, the area lost occurs primarily in higher quality intertidal and shallow subtidal areas.

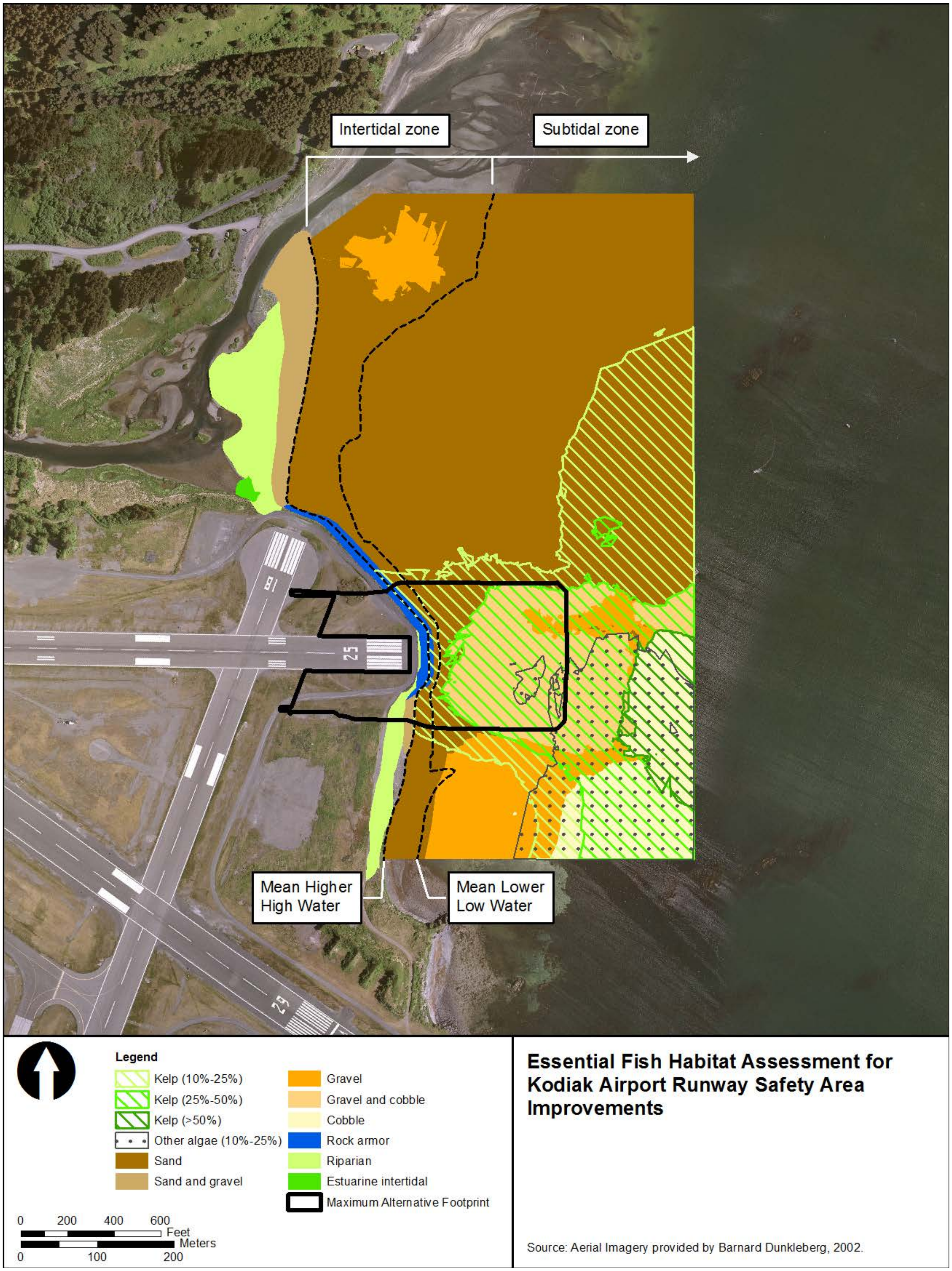

Figure 5. Dominant substrates and algal presence (Runway Ends 18 and 25).

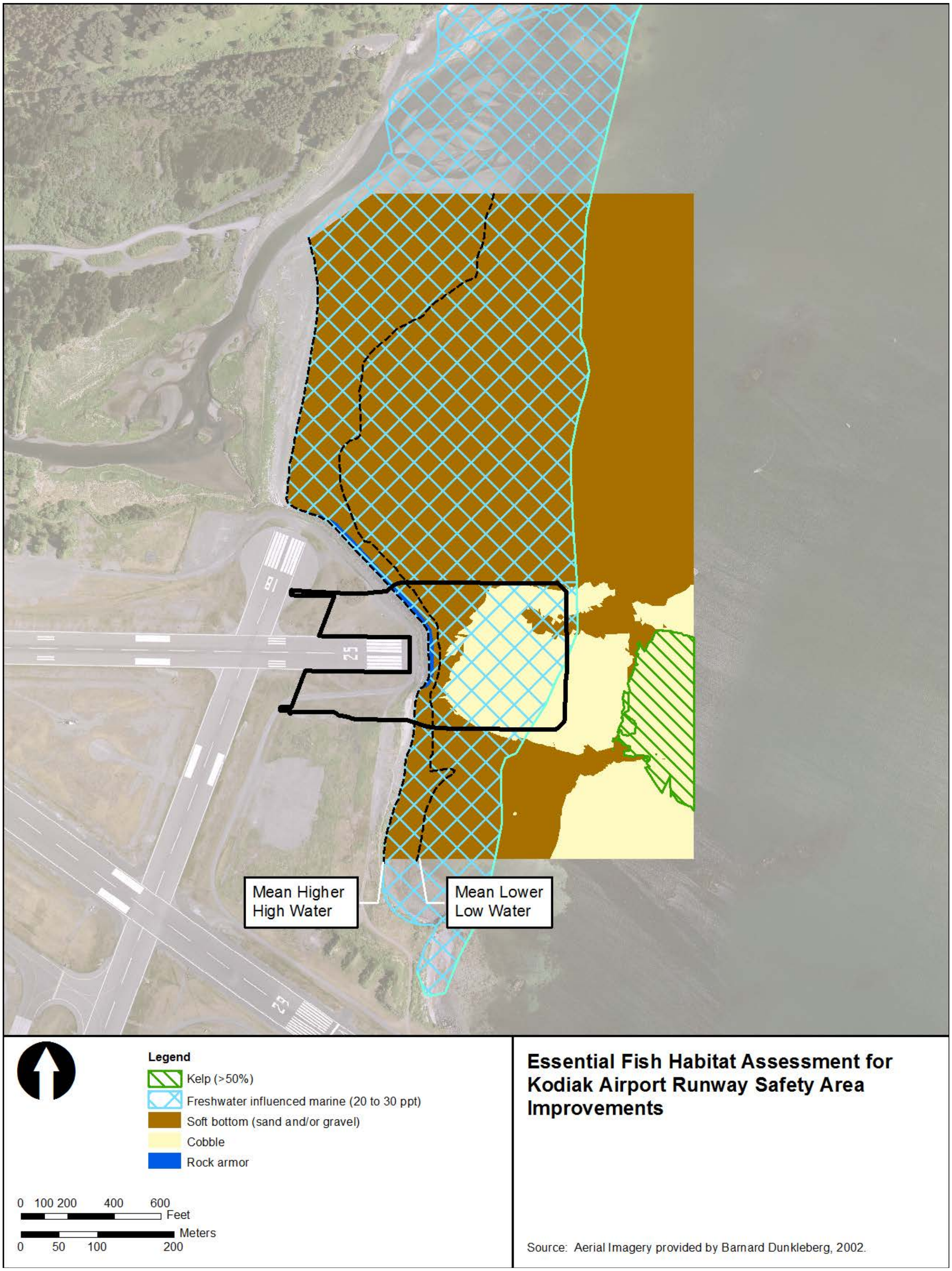

Figure 6. Freshwater-influenced marine habitats in the Airport Project Area.

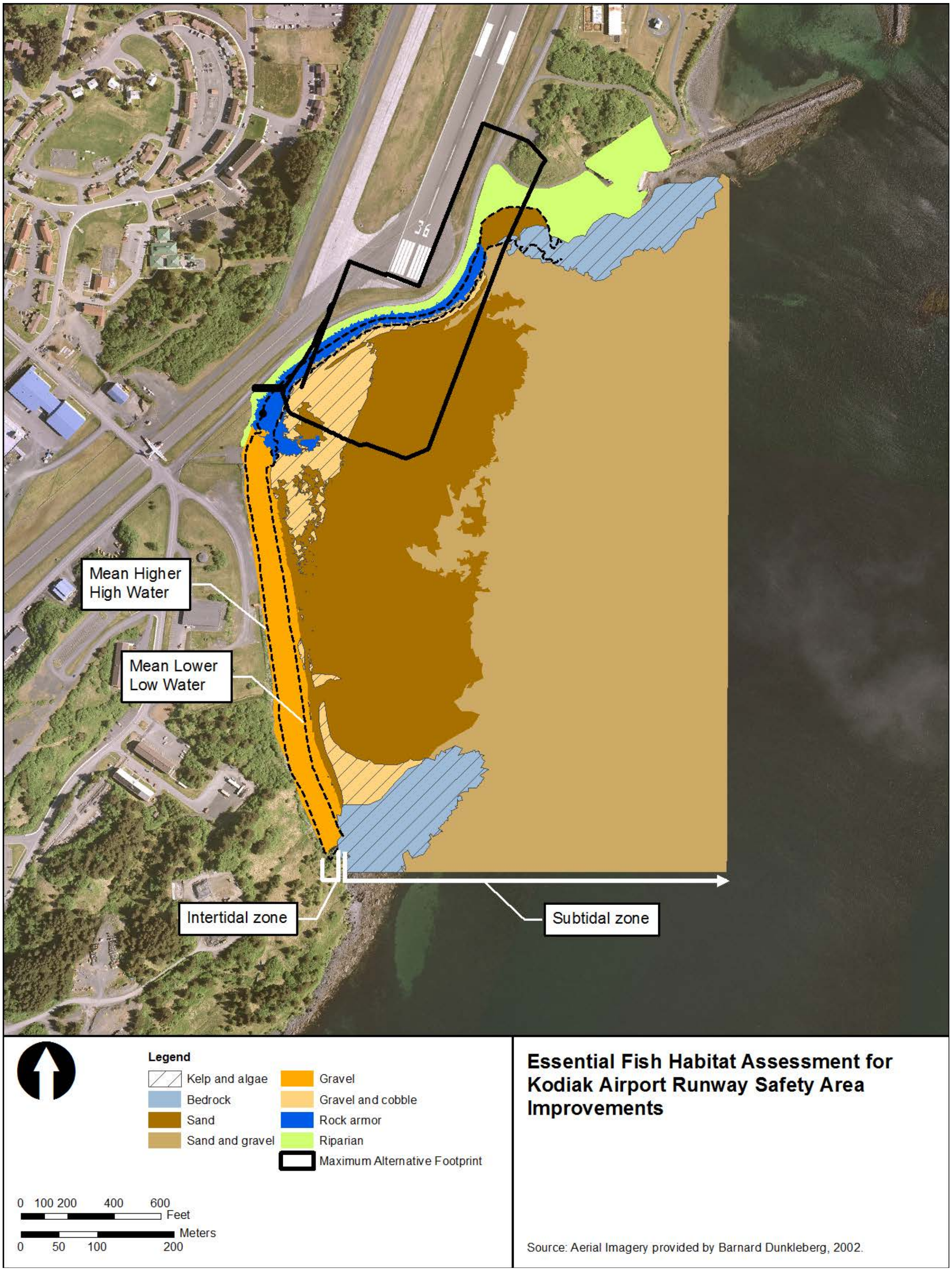

Figure 7. Dominant substrates and algal presence (Runway End 36).

The changes to freshwater influence from the Runway 07/25 RSA extension may result in changes to habitat use by juvenile salmonids. Anadromous species will continue to use the barrier bar area; however, beaches south of Runway end 25 will likely be used less frequently. Since the proposed actions will displace the freshwater plume further off-shore, fish following the shoreline will be displaced into deeper waters (approximately 19.5 feet deeper at high tide). These changes to freshwater influence may keep juvenile pink and chum salmon isolated in the barrier bar area. Though the barrier bar may be more favorable for their needs than the steeper armor-rocked slopes surrounding the runway ends (see Figures 5 and 6), other shallow, low-gradient areas south of Runway end 25 will be more difficult for small smolts to access. Concentrating a greater number of fish into a smaller area will likely have negative impacts to juvenile salmonids because of greater competition for limited resources. Juvenile salmonids following the shoreline into deeper waters around the runway footprints will be exposed to additional predation by larger fish that inhabit deeper waters, and also by fish that will inhabit the new rocky intertidal and subtidal habitats created by the rock armor fill.

As fish are forced to use a smaller area of available habitat, high fish densities can result in negative impacts to the population. In the marine environment, salmon populations may be strongly affected by three density-dependent factors: competition for food, predation, and disease (Groot et al. 1995:488). Some research has shown that density-dependent growth reduction in sockeye salmon takes place during the early stage of marine life and is probably caused by competition for food (Peterman 1984). This density-dependent growth has also been noted for chum salmon during early marine life resulting from competition with juvenile pink salmon (Beacham and Starr 1982).

The area with the densest kelp cover is located outside the fill footprint for Runway 07/25 RSA extension. The majority of the densest kelp bed will still receive some periodic flushing with Buskin River water under certain wind conditions. As a result, some fish, including juvenile coho and sockeye that are able to use deeper water habitats, will still be able to access high-density kelp habitat (sees Figure 5 and 6). The amount of available habitat will be reduced from existing conditions (see Table 3).

The Runway 07/25 proposed action will interfere with nearshore sediment transport processes. This action will bury existing sediment sources (former river deposits near Runway end 25) and "isolate the remaining [sediments] from entering the longshore transport process" (Coastline Engineering and Dynamic Solutions-International 2009). This action will slow or stop the natural migration of the Buskin River mouth and block sediments in the existing northward sediment transport stream, isolating them south of the new RSA fill. The new Runway 07/25 RSA will also shelter the coastline south of the runway from waves from the north and provide protection to the barrier bar from waves from the south. It should not affect access to freshwater spawning or rearing grounds of anadromous species in the Buskin River, and fish passage between marine waters and the river will also not be affected. Changes to sediment transport are not expected to cause aggradation or an accumulation of sediment within the Buskin River estuary (Coastline Engineering and Dynamic Solutions-International 2009).

Fill placed into marine waters to build an RSA may displace a variety of anadromous and marine fish species, including those with EFH or commercial, subsistence, recreational, or cultural importance. Although these mobile species will likely move to other available nearby areas once disturbance begins, sessile marine species, including barnacles, bivalves, chitons, anemones, and algae will be covered by fill. These species are found elsewhere in Chiniak Bay (Stevens et al. 2000), and the amount of direct loss attributable to the RSA expansion project will not threaten their continued existence in the bay or their use for cultural, commercial, or recreational purposes. Effects to these sessile populations, which are capable of recolonizing the new rock armor substrate, will be expected to be local and short term. Effects to species that are not capable of colonizing the new armor rock, such as bivalves that use soft-bottom substrates, will be long term. Though the quantity of these organisms in the Project Area will decrease, fill footprints are relatively small compared to the total amount of subtidal soft-bottom substrates in Chiniak Bay. Thus, the Runway end 25 RSA fill footprint is not expected to have a measurable effect on the total population of bivalves in Chiniak Bay at a landscape scale.

Fill in the deeper subtidal marine waters off Runway end 25 will occur in areas likely to be used by adult salmonids as they forage and stage prior to their spawning migration into fresh water. Adult salmonids will likely avoid construction areas or waters affected by construction, such as turbidity plumes. RSA fill will eliminate some foraging habitat, and fish will be diverted further off-shore. While this is not likely to measurably impact spawning success or body condition for these fish at freshwater entry, there is potential for this loss of habitat to alter predation rates by marine mammals or alter the harvest potential by subsistence fishermen.

RSA fill will also eliminate various freshwater-influenced marine habitats and approximately 650 linear feet of existing shoreline east of Runway end 25. The existing intertidal area consists of armor rock embankment in the upper intertidal area with a narrow sandy lower intertidal area that slopes gently into subtidal gravel and cobble habitat. These habitats currently function as nursery and foraging areas for a variety of fish and invertebrate species. Though it is unknown if spawning occurs in the project footprint, substrates and habitats are appropriate for spawning by some species (including forage fish that salmonids use as prey).

4.3 Impacts to GOA Groundfish EFH

RSA improvements will cause a direct loss of groundfish EFH, displace some groundfish species and their prey, result in the direct loss of aquatic organisms, and create new rocky intertidal and subtidal habitats along the perimeter of the filled area.

Rocky intertidal and subtidal habitats, and nearshore kelp habitats, such as those found off Runway end 25 and 36, support lingcod, kelp greenling, various rockfish, gunnel, and sculpin (Mecklenberg et al. 2002). These habitats function as nursery and foraging grounds for a variety of fish and invertebrate species. Though it is unknown if spawning occurs in the project footprint, substrates and habitats are appropriate for spawning by some species (e.g., Pacific sand lance, surf smelt, capelin, spiny dogfish, red Irish lord, Atka mackerel, yellowfin sole, Pacific staghorn sculpin, great sculpin, and buffalo sculpin). Pacific sand lance, a forage fish documented in the Project Area (SWCA 2009), spawns in sand within shallow (sometimes intertidal) waters throughout November. Eggs and larvae are present in sand and fine gravel from November through March. Sand lance eggs present in the project footprint at the beginning of winter construction will be buried by fill. However, adult fish displaced prior to spawning will likely move to other nearby suitable shallow-water, soft-bottom habitats, including those that surround the project footprint. It is expected that habitats in Chiniak Bay will be capable of supporting the species that will be displaced by the proposed project, and that effects to these populations will be localized and short term.

Habitats off Runway ends 25 and 36 also support various species of algae. Kelp stands ranging from 10% to 50% cover will be destroyed during project construction; however, the highest densities of kelp were documented immediately east of the proposed RSA extensions off Runway end 25 (SWCA 2009). These high-density stands are outside the project's footprint and will not be directly affected by fill placement.

Because substrates in the project footprint will change, fish and invertebrate assemblages using those habitats will also be likely to change. The new armor rock on the RSA side slopes will create new rocky intertidal and rocky subtidal zones along the perimeter of the RSA extension. Runway end 25 currently contains some armor rock in the upper intertidal area, but it does not extend to the subtidal zone (see Figure 5). At Runway end 36, armor rock exists from the supratidal through the subtidal zones. Thus, adverse impacts to habitat are greater at Runway end 25 due to the change in gradient and substrates along the shoreline that will likely result in long-term changes in the assemblage of potential fish prey that live on or in the substrate in the immediate vicinity of the footprints. These changes to the existing shoreline will cause long-term localized changes to fish assemblages. The surface of the new armor rock fill will likely be colonized by species similar to those supported by the existing armor rock shoreline and also by subtidal species.

The changes to invertebrate and prey species assemblages will change fish assemblages that prey on these species, but the habitat transition (to rocky substrate) will also create EFH for some groundfish species. For example, armor rock is characterized by crevices and cracks that may provide shelter from predators, and increased surface area that may serve as a stable substrate for kelp and algal growth. Abundance of species such as sculpins and gunnels, which are often associated with armor rock (Toft et al. 2004), may increase with the project in place. Flat fish, such as flounders and soles, and mobile invertebrate species, such as crab, will be displaced to the remaining suitable shallow-water, soft-bottom habitats that surround the project footprint. Marine species displaced by the new RSA fill will be expected to find suitable habitat nearby.

RSA fill will also eliminate various freshwater-influenced marine habitats and approximately 650 linear feet of existing shoreline east of Runway end 25. The existing intertidal area consists of armor rock embankment in the upper intertidal area with a narrow sandy lower intertidal area that slopes gently into subtidal gravel and cobble habitat. These habitats currently function as nursery and foraging areas for a variety of fish and invertebrate species. Though it is unknown if spawning occurs in the project footprint, substrates and habitats are appropriate for spawning by some groundfish species.

4.4 Effects to Other Species with Important EFH Implications

As was mentioned in Section 3.3, Pacific herring is a species managed under the State of Alaska's jurisdiction and is not included in the forage fish category of the GOA Groundfish FMP. However, an adverse effect on this important prey species will likely result in an adverse effect on other managed species; therefore effects on herring are included in this EFHA. The subtidal habitat near Runway end 36 is known to serve as a herring congregation area where herring gather prior to spawning in other locations in Chiniak Bay (J. Dinnocenzo, personal communication 2009). Herring will be temporarily displaced from this area during construction. However, it is expected that they will continue to use the bay as a gathering location following construction, and they will be further displaced into the main channel of Chiniak Bay.

4.5 Construction Impacts

Construction timing is an important factor in determining the magnitude and extent of impacts to aquatic species and EFH. Because of the mild Kodiak climate, a year-round construction schedule will be feasible for most of the project. Therefore, seasonal species use of habitats in the Project Area was evaluated for the entire calendar year to determine potential impacts resulting from construction timing (Table 4). The evaluation focused on critical life stages such as hatching, outmigration, and spawning or birthing, as species may be more susceptible to disturbance during these phases (Heard 1991; Warren 1991). Because the project area includes marine, estuarine, and freshwater habitats used by a variety of species, there are critical life stages that occur throughout the year and no single work window will avoid all species. However, a November-through-February time frame for marine in-water work will avoid or minimize impacts to most salmonids, marine fishes (including groundfish), and EFH. Because the timing of aquatic species presence coincides with the timing of heavy air traffic (e.g., salmon runs are linked with the timing of commercial fisheries, recreational use, and tourism) the November-through-February time frame will also minimize impacts to large aircraft operations. In-water construction activities during these winter months will largely avoid peak outmigration and spawning migration of most salmon, with the exception of the end of coho outmigration, which can occur into November. In-water work will not block fish passage but could temporarily disrupt, displace, or reduce local abundance of fish in the construction area.

Some important EFH species have critical life stages that may overlap with a winter in-water work window (see Table 4). For example, spiny dogfish use nearshore shallow waters during this time for mating or birthing. Pacific staghorn sculpins spawn in soft-bottom intertidal to subtidal areas from October through April. Sand lance, a forage fish documented in the Project Area, spawn in sand in shallow waters throughout November, and eggs and larvae are present in sand and fine gravel from November through March. A variety of righteye flounder species spawn from February through May. Construction during these times may temporarily disrupt, delay, or displace these aquatic species during a time when they may be more sensitive to environmental changes.

Table 4. Timing of Habitat Use for Salmon and Groundfish in Marine and Freshwater Environments of the Kodiak Airport Project Area

Species	Life Stage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	RWE[1] 18	25	36
Salmon																
Pink salmon[2]	Return to fresh water													•		
	Spawning								late						n/a	
	Outmigration													•	•	
	Estuary and nearshore rearing													•	•	
Sockeye salmon[3]	Return to fresh water						late							•		
	Spawning														n/a	
	outmigration													•	•	
	Estuary and nearshore rearing													•	•	
Chum salmon[4]	Return to fresh water													•		
	Spawning								late						n/a	
	Outmigration													•	•	
	Estuary and nearshore rearing													•	•	
Coho salmon[5]	Adults congregate offshore								peak: wk. 3					•	•	•
	Return to fresh water								late					•		
	Spawning														n/a	
	Outmigration															
	Estuary and nearshore rearing													•	•	
Chinook salmon[6]	Adults in marine water													•	•	•
Groundfish																
Sharks (spiny dogfish)[7]	In shallow nearshore waters													•	•	•
	Birthing in shallow nearshore waters															
Cods[8]	Walleye pollock and Pacific cod spawning and use of shallow nearshore waters													•	•	•
Righteye flounders[9]	Spawning in nearshore shallows													•	•	•
Rockfish[10]	Juvenile rearing in nearshore shallows														•	•
Sablefish[11]	Juvenile rearing in nearshore shallows													•	•	•
Atka mackerel[12]	Spawning														•	•

Species	Life Stage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	RWE[1]		
Sculpins[13]	Buffalo sculpin spawning													•	•	•
	Red Irish lord spawning														•	•
	Pacific staghorn sculpin spawning													•	•	•
Capelin[14]	Adult spawning													•	•	
	Eggs present in intertidal fine gravel/sand															
	Larval presence/hatching															
Smelts (anadromous)[15]	Spawning in lower reaches of rivers													•		
	Outmigration													•	•	
Sandfish[16]	Larvae in nearshore shallow waters													•	•	•
Pacific herring[17]	Spawning in aquatic vegetation in shallow water														•	
Pacific sand lance[18]	Nearshore activity, adults													•	•	•
	Spawning															
	Eggs present in intertidal fine gravel/sand															
	Larval presence/hatching															

Key: range of activity | greater activity | peak of activity

Note: Timing information for skates, pricklebacks, and gunnels was not available at the time of writing.
[1] RWE: Runway end with habitat appropriate for species life stage.
[2] ADF&G 1994; Murray 1986.
[3] S. Maclean, personal communication 2007; Murray 1986; Schmidt et al. 2005; D. Urban, personal communication April 2008.
[4] Groot and Margolis 1991; S. Maclean, personal communication 2007.
[5] ADF&G 1994, 2012; Murray 1986.
[6] ADF&G 1994, 2012; Murray 1986.
[7] NOAA 2005.
[8] ADF&G 2009; PFMC 2005.
[9] PFMC 2005.
[10] PFMC 2005.
[11] NMFS 2009.
[12] ADF&G 1994; ADF&G 2009.
[13] CDFG 2009; Goodson and Weisgerber 1988; Sempier 2003.
[14] S. Maclean, personal communication 2007; NPFMC 2009; Ormseth et al. 2008.
[15] ADF&G 1994; PFMC 2005.
[16] Thedinga et al. 2006.
[17] ADF&G 1994.
[18] S. Payne, personal communication 2008; Robards et al. 1999.

No in-water work in freshwater habitats is anticipated. A December-through-February window will avoid peak spawning and migrations for all salmon, except coho that can spawn into December.

Localized and short-term increases in suspended sediment and turbidity may result from placement of fill into marine habitat. The extent of increased turbidity will depend primarily on the construction methods and the content of fine-grained materials in the fill. Core materials for the RSAs will be gravel/cobble sized and larger, and these sediments are expected to rapidly settle out of the water column. Impacts to EFH resulting from increases in turbidity during construction will be minimized by using BMPs and conservation measures (see Section 6.0). It is expected that fish present during the initial phases of construction will move to areas where turbidity impacts can be avoided. Impacts to EFH from construction-related turbidity are expected to be minor, localized, and of short duration.

5.0 CONCLUSIONS

The proposed actions will adversely affect salmon and groundfish EFH. Extension of the Runway end 25 RSA will likely result in long-term impacts to salmon and groundfish EFH due to the loss of habitat containing kelp and other algae, and modification of existing slopes and substrates, which will displace juvenile salmon to habitats that are not comparable to existing salmon EFH.

Due to the existing steep, armored shoreline, limited algal cover, and low habitat complexity of this area, effects to salmon and groundfish EFH from extension of the Runway end 36 RSA will likely be lesser. Although there will be a loss of EFH, biotic communities will likely remain similar to existing communities and displaced organisms will be expected to find suitable nearby habitat.

Short-term degradation of water quality from increased turbidity will result from construction at Runway ends 25 and 36. These construction impacts should be localized and minor.

6.0 CONSERVATION MEASURES

Implementation of the proposed project may include a variety of conservation measures and BMPs. Proposed conservation measures are expected to reduce or eliminate project-related impacts to EFH. Where appropriate, conservation measures will be implemented using an adaptive management approach. BMPs will be used to minimize impacts to EFH during construction.

Potential conservation measures under consideration include:

- Phasing construction timing in marine areas so that in-water work occurs from November through February will minimize impacts to most salmon and groundfish EFH. Phasing in-water construction timing to occur in estuarine areas from December through February will avoid peak spawning and migrations for most salmon (coho can spawn into December), thus minimizing impacts to EFH.

BMPs will be used to minimize effects to EFH during construction.

- Fill materials will be obtained from commercial sources (along the road system, if possible) and will be clean (i.e., contain minimal fine particles such as silt and clay) to minimize sediment releases and turbidity outside of the fill zone.
- Fill materials will be nontoxic and free of invasive species.
- Potential for fuel, oil, or hydraulic fluid spills or leakage from construction equipment will be minimized.
- A construction stormwater pollution prevention plan (SWPPP) and a construction oil spill prevention plan will be prepared to avoid or minimize discharges of sediment or hydrocarbons during construction.
- Silt curtains will be the primary method of containment at both runway ends. If silt curtains are determined to not adequately contain fine sediments during fill activities, other techniques will be used to minimize sedimentation dispersion in the marine environment, such as alternative fill placement methods or washing the fill. These alternative methods will be developed for and documented in the SWPPP. If methods included in the SWPPP are not successful, the SWPPP will be modified to identify alternative methods for sediment containment, and the U.S. Fish and Wildlife Service will be provided an opportunity to review the revisions prior to implementation.
- BMPs for erosion and sediment control will be used during construction activities to minimize the introduction of suspended sediment to EFH.
- Material barges will not be grounded in kelp stands.
- Barges will adhere to standard protocols for ballast water exchange and hull inspection to minimize the risk of invasive species introductions.
- Barges used for construction will follow standard BMPs for vessels to minimize the potential for oil or fuel spills (such as having an oil spill emergency plan). The only oil or fuel associated with barging of construction materials would be the fuel tanks used to operate equipment to move the materials

7.0 COMPENSATORY MITIGATION MEASURES

Potential mitigation measures addressing the unavoidable loss of marine habitat resulting from RSA improvements will likely focus on direct payment of in lieu fees to agencies or organizations to fund preservation, restoration, or enhancement programs, or conservation easements in the Kodiak area.

8.0 REFERENCES CITED

Alaska Department of Fish and Game (ADF&G). 1994. Wildlife notebook. Available at: http://www.adfg.state.ak.us/pubs/notebook/notehome.php. Accessed November 10, 2008.

ADF&G. 2009. Walleye pollack fisheries in Alaska. Available at: http://www.cf.adfg.state.ak.us/geninfo/finfish/grndfish/pollock/pollockhome.php. Accessed July 27, 2009.

ADF&G. 2012. Anadromous Waters Atlas, KOD250, Quad No. 038 Kodiak Index. Available at: http://www.adfg.alaska.gov/sf/SARR/AWC/index.cfm?ADFG=main.home. Accessed June 27, 2012.

Beacham, T.D., and P. Starr. 1982. Population biology of chum salmon, *Oncorhynchus keta*, from the Fraser River, British Columbia. *Fisheries Bulletin* 80:813–825.

California Department of Fish and Game (CDFG). 2009. Marine sportfish identification: other fishes. Available at: http://www.dfg.ca.gov/marine/mspcont7.asp. Accessed July 27, 2009.

Coastline Engineering, and Dynamic Solutions-International, LLC. 2009. *Runway Safety Area Improvement Alternatives Study; Includes Coastal and Near-Shore Process Description, Circulation and Water Quality Modeling, and Wave Modeling (Existing Conditions).* Draft technical report, May 2009. Anchorage: Coastline Engineering, and Dynamic Solutions-International.

DOWL Engineers. 2007. Topographic map of Kodiak Airport vicinity. On file, DOWL Engineers, Anchorage, Alaska, and SWCA Environmental Consultants, Portland, Oregon.

DOWL HKM. 2009. *Draft Construction Methods and Issues Kodiak Airport EIS 2009*. Anchorage: DOWL HKM.

Dugan, J.E., D.M. Hubbard, H.M. Page, and J. Schimel. 2011. Marine macrophyte wrack inputs and dissolved nutrients in beach sands. *Estuaries and Coasts* 34:839–850.

Goodson, G., and P.J. Weisgerber. 1988. *Fishes of the Pacific Coast*. Palo Alto, California: Stanford University Press.

Groot, C., and L. Margolis, eds. 1991. *Pacific Salmon Life Histories*. Vancouver: University of British Columbia Press.

Groot, C., L. Margolis, and W.C. Clarke. 1995. *Physiological Ecology of Pacific Salmon*. Vancouver: University of British Columbia Press.

Heard, W.R. 1991. Life history of pink salmon (*Oncorhynchus gorbuscha*). In *Pacific Salmon Life Histories*, edited by C. Groot and L. Margolis, pp. 120–230. Vancouver: University of British Columbia Press.

Konar, B. 2007. Recolonization of a high latitude hard-bottom nearshore community. *Polar Biology* 30:663–667.

Lacroix, D.L. 2001. Foraging impacts and patterns of wintering surf scooters feeding on bay mussels in coastal strait of Georgia, British Columbia. Master's thesis, Department of Biological Sciences, Simon Fraser University.

Mecklenburg, C.W., T.A. Mecklenburg, and L.K. Thorsteinson. 2002. *Fishes of Alaska*. Bethesda, Maryland: American Fisheries Society.

Murray, J.B. 1986. *Annual Performance Report for Buskin River Weir.* Vol. 27. Study S-41 Kodiak Salmon Studies. Kodiak: Alaska Department of Fish and Game. Available at: http://www.sf.adfg.state.ak.us/FedAidPDFs/fredf-10-1(27)S-41-2.pdf. Accessed December 12, 2008.

National Marine Fisheries Service (NMFS). 1997. Magnuson-Stevens Act Provisions; Essential fish habitat, interim final rule. *Federal Register* 62(244):66531-66559.

NMFS. 2005. Appendix F.5: EFH report for the salmon fisheries in the EEZ off the coast of Alaska. In *Final Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska*. Available at: http://www.fakr.noaa.gov/habitat/seis/final/Volume_II/Appendix_F.5.pdf.

NMFS. 2005. *Final Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska, Vol. 1*. Juneau, Alaska: NOAA Fisheries, NMFS Alaska Region.

NMFS. 2009. Fisheries behavioral ecology focal species – sablefish. Available at: http://www.afsc.noaa.gov/race/behavioral/sablefish_fbe.htm.

National Oceanic and Atmospheric Administration (NOAA). 2005. *EFH Assessment Report for the Groundfish Resources of the Gulf of Alaska Region*. April 2005. Juneau: NMFS Alaska Region.

North Pacific Fishery Management Council (NPFMC). 2008. *Fishery Management Plan for Groundfish of the Gulf of Alaska*. January 2008. Anchorage: North Pacific Fishery Management Council.

NPFMC. 2009. *Fishery Management Plan for Groundfish of the Gulf of Alaska*. January 2009. Anchorage: North Pacific Fishery Management Council.

Ormseth, O.A., L. Connors, M. Guttormsen, and J. Vollenweider. 2008. Appendix 2: Forage fishes in the Gulf of Alaska. In *North Pacific Fisheries Management Council Gulf of Alaska SAFE*, pp. 657–702. Anchorage, Alaska: North Pacific Fisheries Management Council.

Pacific Fishery Management Council (PFMC). 2005. *Pacific Coast Groundfish EFH FEIS. Pacific Coast Groundfish Fishery Management Plan for the California, Oregon, and*

Washington Groundfish Fishery Appendix B Part 2 Groundfish Life History Descriptions. Portland, OR: Pacific Fishery Management Council.

Peterman, R.M. 1984. Density-dependent growth in early ocean life of sockeye salmon (*Oncorhynchus nerka*). *Canadian Journal of Fisheries and Aquatic Sciences* 41:1825–1829.

Robards, M.D., M.F. Willson, R.H. Armstrong, and J.F. Piatt, (eds.). 1999. *Sand Lance: A Review of Biology and Predator Relations and Annotated Bibliography*. Research Paper PNW-RP 521. Portland, Oregon: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Schmidt, J., D. Evans, and D. Tracy. 2005. *Stock Assessment of Sockeye Salmon of the Buskin River, 2000-2003*. Anchorage: Alaska Department of Fish and Game, Divisions of Sport Fish and Commercial Fisheries. Available at: http://library.state.ak.us/asp/edocs/2006/02/ocm64276950.pdf. Accessed April 8, 2008.

Sempier, S. 2003. Marine species with aquaculture potential off the coast of Oregon and the Pacific Northwest: red Irish lord. Available at: http://hmsc.oregonstate.edu/projects/msap/PS/masterlist/fish/redirishlord.html. Accessed July 27, 2009.

Sobocinski, K.L. 2003. The impact of shoreline armoring on supratidal beach fauna of Central Puget Sound. Master's thesis, University of Washington, Seattle.

Stevens, B.G., I. Vining, S. Byersdorfer, and W. Donaldson. 2000. Ghost fishing by Tanner crab pots off Kodiak, Alaska: pot density and catch per trap as determined from sidescan sonar and pot recovery data. *Fishery Bulletin* 98(2):389–399.

SWCA Environmental Consultants (SWCA). 2009. *Kodiak Airport EIS Technical Report on Freshwater and Marine Ecology*. Portland, Oregon: SWCA Environmental Consultants.

Thedinga, J.S., S.W. Johnson, and D.G. Mortensen. 2006. Habitat, age, and diet of a forage fish in southeast Alaska: Pacific sandfish (*Trichodon trichodon*). *Fishery Bulletin* 104(4):631-637.

Toft, J., C. Simenstad, J.R. Cordell, and L. Stamatiou. 2004. *Fish Distribution, Abundance, and Behavior at Nearshore Habitats along City of Seattle Marine Shorelines, with an Emphasis on Juvenile Salmonids*. Report No. SAFS-UW-0401. Seattle: University of Washington, School of Aquatic and Fishery Sciences.

Warren, J.W. 1991. *Diseases of Hatchery Fish*. 6th ed. Pacific Region: US Fish and Wildlife Service.

9.0 PERSONAL COMMUNICATIONS CITED

Dinnocenzo, Joe. Fisheries Biologist, Alaska Department of Fish and Game. Communication with George Weekley, SWCA, January 21, 2009.

Maclean, Scott. Kodiak Airport RSA improvements EIS, initial scoping comments. Letter to Leslie Grey, Federal Aviation Administration, Alaska Region Airports Division, April 9, 2007, from S. Maclean, Habitat Biologist, Anchorage Area Office, State of Alaska, Department of Natural Resources, Office of Habitat Management and Permitting.

Payne, S. Biologist, Alaska Fisheries Science Center, National Marine Fisheries Service. Pacific sand lance data for Buskin River area. Meeting with Paul Fishman, SWCA, at NMFS Kodiak office, January 29, 2008.

Urban, D. Research Fishery Biologist, Kodiak Laboratory, Alaska Fisheries Science Center, National Marine Fisheries Service. Additions to draft Kodiak Airport EIS freshwater and marine timing chart re: timing of sport fishing and subsistence harvest for sockeye salmon. Correspondence with Cathy Foy, SWCA, April 2008.